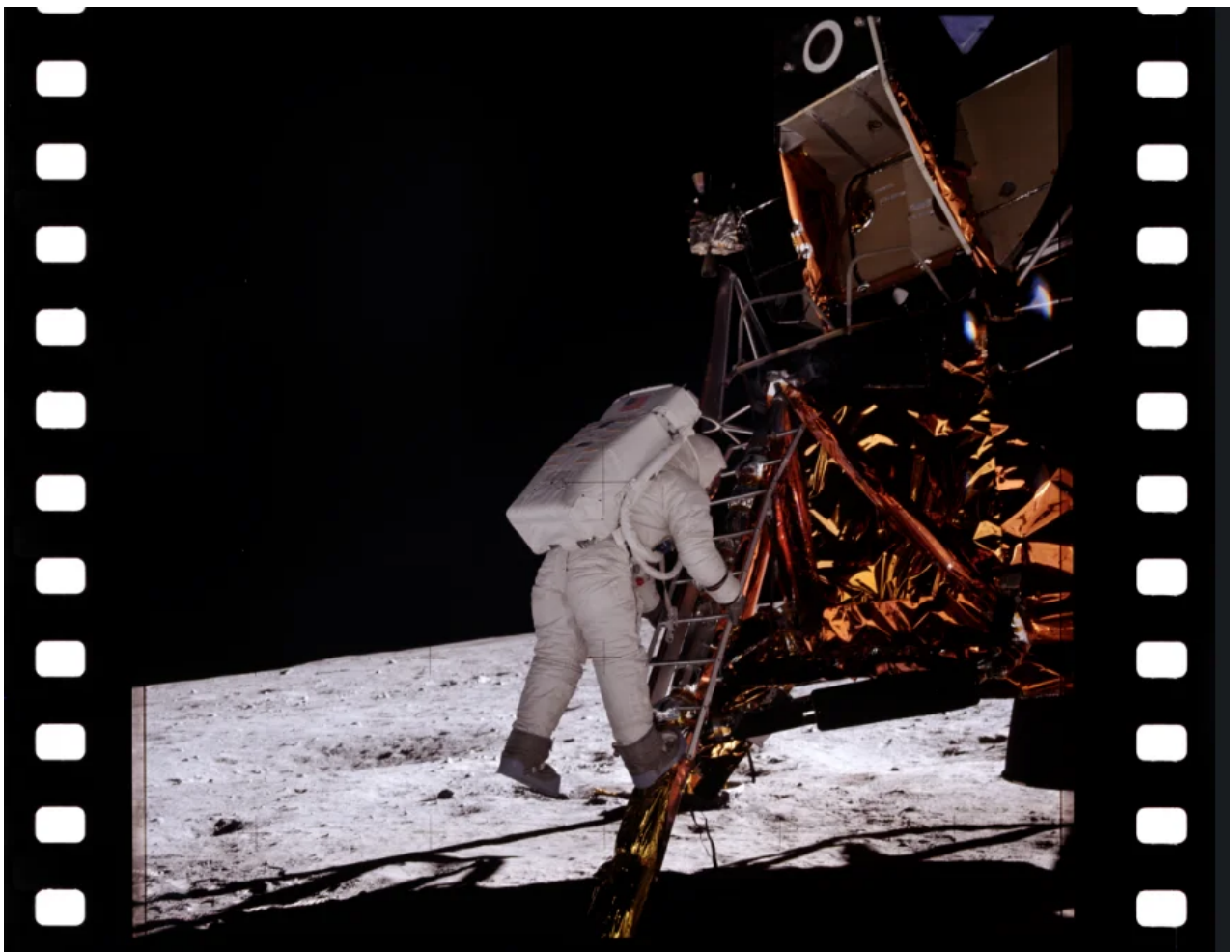


49. Почему для изготовления оригиналов лунных снимков понадобился Интермедиат?

12-15 minutes

Yes Yes Yes. Believe it or not, it seems incredible, but the originals of the color lunar images, which are stored at NASA at the Johnson Space Center, were not made on reversible Ektahrom photographic film, as indicated in all sources. They were made on a completely different tape, which, perhaps, you have not heard of at all - on the Intermedia film strip.

But what about the captions under all the "moon" photographs? [Ektachrome is also listed there!](#)



A still from the Apollo 11 mission.

Детали Изображения

Идентификатор Изображения	AS11-40-5868
Программа	Аполлон
Номер Миссии	11
Номер Кадра	5868
Журнал	40
Камера	Hasselblad 500EL Data Camera 70 мм
Объектив	Zeiss Biogon 60 мм f/5.6
Тип Пленки	Kodak Ektachrome SO-168 EF high speed ASA 160 color reversal
Журнал Alt	C

Photo caption. It is indicated that the frame was shot on a color reversible photographic film Ektachrom with a photosensitivity of 160 ASA units.

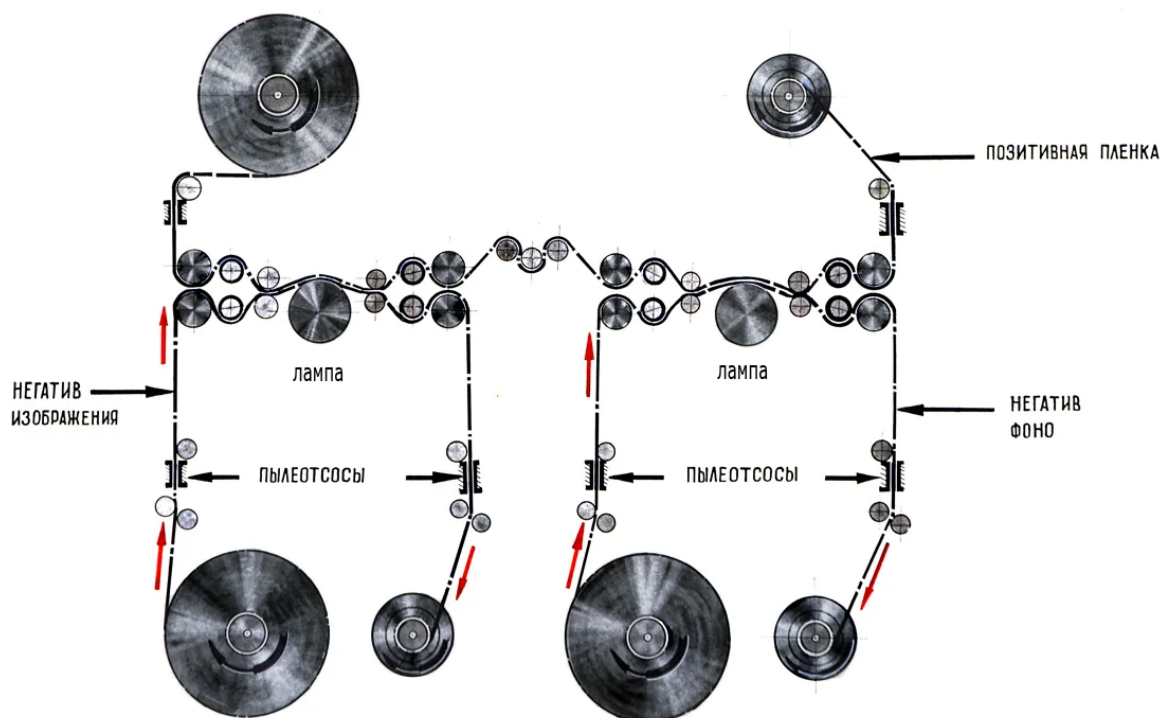
Indeed, under the photographs it is indicated that the "lunar" shots were taken on the "Ektachrome", that this is a color reversible photographic film. But what kind of film is "Intermedia"? Where did it come from? She is not mentioned anywhere at all!

So let me tell you a little about Intermediate. This is not some exotic film. This is an ordinary counter-type film, which until recently was released in millions of meters, and without these films, no film could be released. "Contrasting" means duplicating tape.

Why is there a need for counterfeit films? Imagine a typical situation, for example, in 2008, when the premiere of a new blockbuster is appointed. In those years, most cinemas were showing films from cinematography. And on the day of the premiere, this film on the same day will be shown not only in several cinemas, but in many cities at once. If this is a blockbuster and it is being broadcast in Russia, then 800 to 1100 copies of this film may be required.

To obtain a film copy, the negative roller is rewound from one side of the copier to the other side, passing by the light slit. The image from the negative is reprinted onto positive film. The sound track from the phonogram roller, which is located nearby on the copier, is also imprinted on the same positive film.

СХЕМА КОПИРОВАЛЬНОГО АППАРАТА



The scheme of printing a film copy on a copier: on a roll of positive film, which is charged from above, printing is carried out from two films - from the negative of the image and from the negative of sound (phonogram).

Since after printing the negative roll is at the end, it (like the phonogram roll) is rewound to the beginning. While mass printing is in progress, which can take several days, the negative image roll is constantly rewound back and forth. It's easy to guess how the negative will look after thousands of runs. He will be scratched all over.

Now imagine that some Hollywood blockbuster is shown in several countries at once. And what is required is not a thousand copies, but several tens of thousands of film copies. Not a single negative can withstand such a circulation. Besides, who will allow the negative of a blockbuster to be transferred somewhere to another country for deliberate "destruction"? The original negative is carefully guarded. Duplicates are made from it (a duplicate of a negative is called a counter type), and duplicates are sold to different countries for subsequent replication in their own country.

Many years of efforts by Kodak Film Design Engineers have been aimed at making such a counterfeit film so that the image printed from it does not differ visually from the image printed from the original negative.

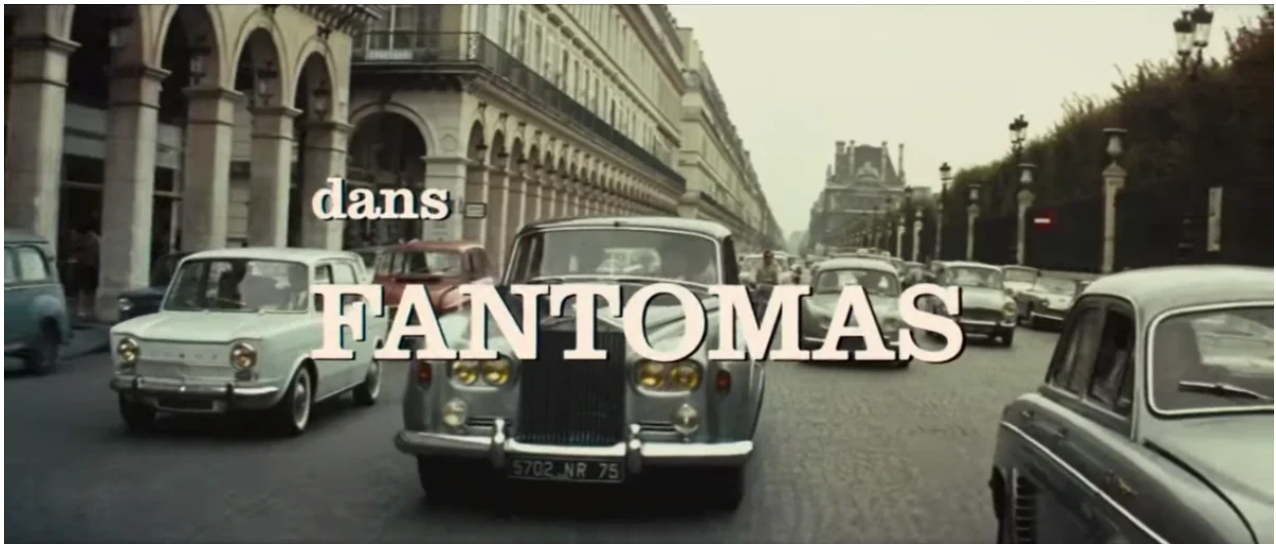
Conventional negative film is not very suitable for counter typing purposes, primarily due to its graininess. All negative films have high sensitivity, and the higher the film's light sensitivity, the larger the grain on it. And if you make a duplicate on negative film, the graininess will only increase. Unlike negative ones, counter type films have a very low light sensitivity (no more than 1.5 ISO units) and, accordingly, very fine grain.

Negative films (or reversible films) are not suitable for counter typing for one more reason - they are sensitive to all visible rays of the spectrum, they would have to be worked with in complete darkness, placing reels of film on the copier by touch, and having no control over the printing process. But counter type films have a small dip

in the sensitivity in the region of 570-580 nm, between the green and red sensitivity zones. Visually, 580 nm is a color close to the emission of yellow sodium lamps, so the copy department, where they work with positive and countertype materials, is illuminated with a faint non-actinic warm yellow light.

But not only for the replication of films, counter-type film is used. For many combined shots, this particular film is used.

Here's the simplest example - captions on an image Very often in films, we see the opening credits (the name of the film, the leading actors) on a moving background, in the image.



The title of the film ("Fantomas") on a moving background.

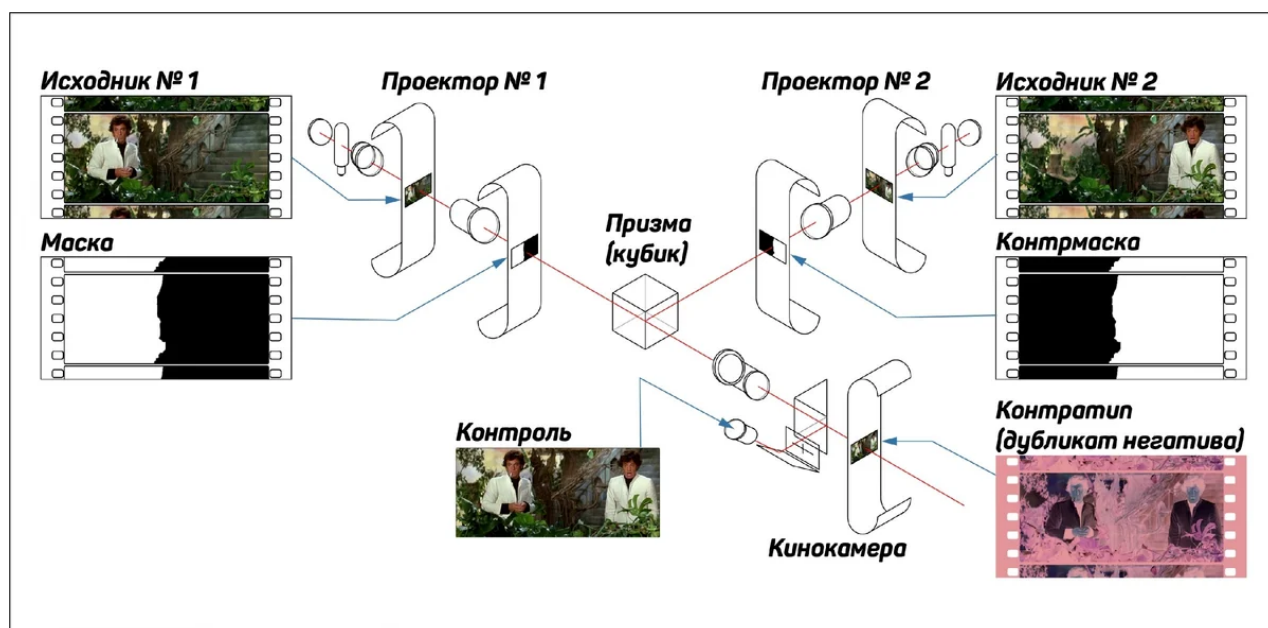
But those credits weren't filmed on the day the cast and car footage was filmed. The decision to put titles on this particular image and precisely this duration was made already at the final stage of editing. To make the credits appear in the right place, a duplicate was made from the original negative and the credits were imprinted into this duplicate. In the original negative itself, there were no captions; they appeared only in a duplicate, in a countertype. These credits were combined with the background image on the **stunt machine**.

The article "[Why did shadows appear in the lunar sky?](#)" we showed the appearance of this trick machine when we gave an example of a composite shot from the movie "The Beast". There, the actor J.P. Belmondo plays two roles at once, two different characters. Sometimes these two characters appear in the same frame at the same time.



Combo shot in two parts. Actor J.P. Belmondo plays two roles at once.

To obtain such a frame, two different images were brought together on a trick machine in which two projectors are installed at right angles to each other and one movie camera.



Combining two images and two masks on a trick machine.

One projector (No. 1, left) was charged with a film (positive image), where the actor plays the first character. Since the actor was on the left, and he should be visible, a mask was set in front of this frame, transparent on the left and opaque on the right side. The opaque mask covered the right side of the frame, where there was no one.

In another projector (No. 2, on the right), a film was loaded, where the actor in the right half of the frame played the second character. In this case, part of the frame was covered by another mask, this is a counter mask. She opened the character on the right side of the frame and covered the left side of the frame.

These two images were projected onto two sides of a beamsplitter cube, sawn in half to form a 45 ° side, and joined together in one frame. The operator immediately saw the final, combined image in the camera. The camcorder was loaded with counterfeit tape. After development, a negative was obtained on it. And since the film was masked, the negative visually looked pinkish-red (see the picture above). And now a countertype (combined frame) is inserted into the film as the original on the Intermedia film.

On closer inspection, you can see the border of the mask in the frame.

Fragment from the film "The Monster" (France, 1977)



The border of the mask is a zigzag curve.

When we saw in the photograph "Astronaut Harrison Schmidt on the Moon" (Apollo 17 mission, 1972) a zigzag curve going from top to bottom, we immediately knew that this was the border of the mask.



Components of a photograph from the Apollo 17 mission.

And the photo itself was obtained in the same combined way as in the movie "The Beast" - from two shots connected on a trick machine.

The original images for the "lunar" image themselves, it is quite possible that they were captured on reversible film by Ektahrom. But these were "semi-finished products" and were not shown to anyone. But the final image was already on the Intermedia tape.

In some cases, the source was 35mm film. But then the image from this small-format film was displayed on perforated 70-mm film and passed off as an original from the Moon, allegedly taken with a medium-format Hasselblad camera. This was my interview in the program of Dmitry Peretolchin on the DenTV channel "[Why doesn't NASA get an Oscar?](#)"

NASA was well aware that in the production of "lunar" images there will be a large volume of combined surveys, there will be stages of copying - the production of intermediate positives and double negatives (countertypes). It is possible to make precise alignment of two frames only if the accuracy of positioning of objects in the frame is ensured, and this is possible only if there are perforations on the film.

That is why, instead of the standard 60 mm non-perforated film for "Hasselblad", 70-mm film with perforations appeared.



60mm non-perforated film for medium format cameras.

70mm perforated film can be seen in the photo at the very beginning of the article.

Perforations are needed on film because they help to accomplish two technical tasks during filming: fast film pulling after exposure in start-stop mode (24 times per second) and precise positioning of the image from frame to frame (image stability).

But after all, during photography there is no need to quickly pull on the film - on Hasselblad it takes about 2 seconds to shoot and advance one frame. In addition, given the specifics of photography "on the Moon", we understand that there is no need (and technical possibility) to take photographs so often - every 2 seconds.

They can object to me, saying that the cassettes for lunar expeditions contained 160 frames each, the film roll was much longer and larger in roll diameter than the standard type 120 (which fits 12 frames or even type 220 with 24 frames 6x6 cm). And supposedly perforations are needed to promote such a quantity of photographic film. Of course, you can argue that way. But practice says that perforations are not necessary for transporting such a length of a roll. The very first camera, released under the Kodak brand in 1888, was charged with 100-frame film. And the film was without perforations. Even in 1888, there were no problems in advancing a 100-frame film clip along the film path. Besides, what is 100 or even 160 frames in length? It is only 9 meters. 160 frames is a small roll of 9 meters.

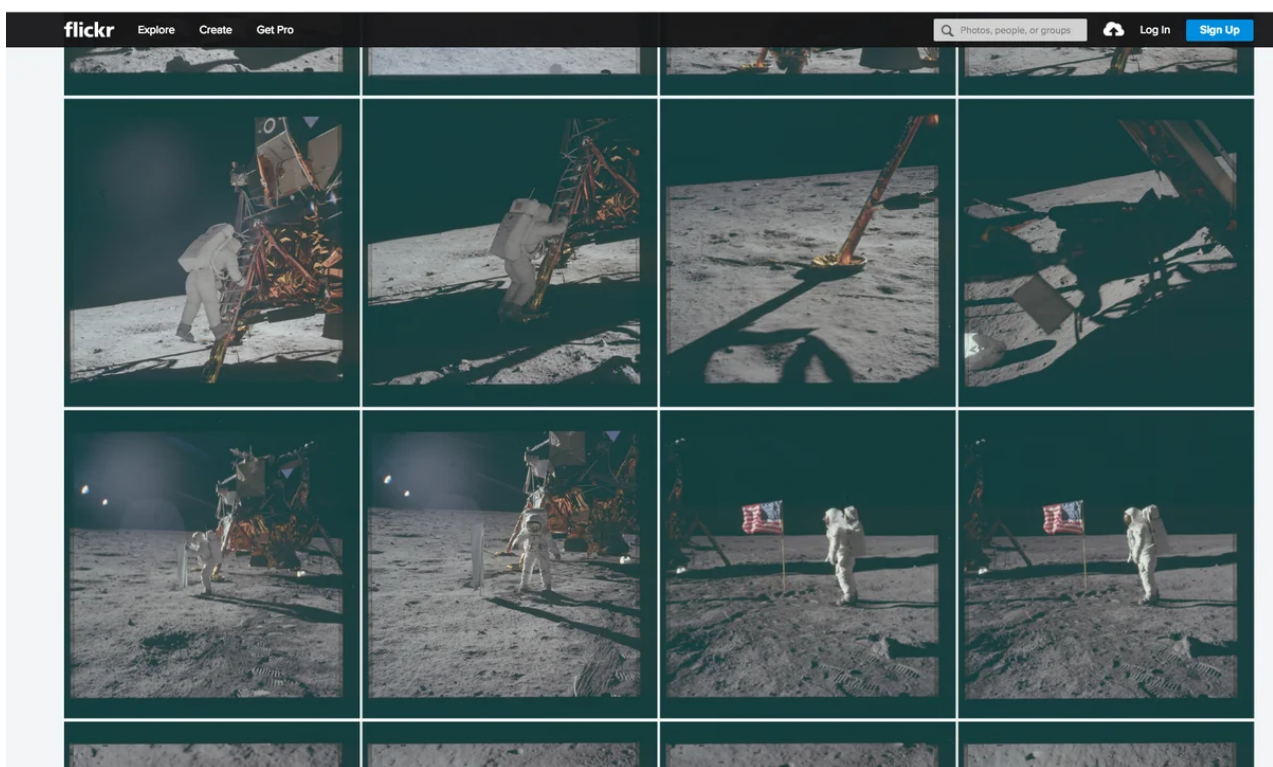
Of course, there will be people who will write that an ordinary 35-mm camera was charged with perforated film with two rows of perforations, although there are only 36 frames on the film and the roll length is 1.65 m. In response to this, I can only say one thing. 35mm film has been used in cinematography since 1894 (it was Edison). And only 20 years later, camera manufacturers began to think - why not make a camera into which you can load film? The first samples of such cameras were bulky and inconvenient, until in 1925 the serial production Leica ([Leica](#)).

Such a simple question - "How were the color images from the Moon obtained in the Apollo missions?" - only at first glance it seems unambiguous.

For an uninitiated person, the process seems completely simple. An astronaut on the moon is filming with a medium format Hasselblad camera on Ektahrom reversible color film. Then the cassette with photographic film is delivered to Earth, where, in the US laboratory, it is processed in a developing machine according to a special treatment process, in which, bypassing the negative stage, a positive is immediately obtained - a transparent slide. And this film can already be demonstrated.

In fact, the chain of obtaining a photograph, which is passed off as ORIGINAL, stretches over a large number of stages, includes films of different sensitivity and contrast (reversible and counter-type films). In this case, there are several operations of reprinting, retouching and finalizing the image, so that the so-called "ORIGINAL" received at the end of the chain no longer looks like the SOURCE. In the end, the original turns out to be not a slide film, but an image printed on masked Intermedia film.

If we take the originals of the "moon images" scanned in 2005, laid out on Flickr, which were not processed by levels (unprocessed), and invert them, we will see a negative with a pink-red mask.



This is what the raw images scanned in 2005 look like.



After inverting, we see a pink mask.

This is exactly how the ORIGINALS of "lunar images", which are stored in NASA, look like - these are not slides on reversible Ektahrom photographic film, these are countertypes made on masked Intermedia film. And then these scanned "intermediates" in a graphics editor are inverted into a positive, they are given the necessary look and are presented as a reversible photographic film Ektakhrom.

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Previous articles on scanning ORIGINALS of lunar images:

47. [The originals of the lunar photographs have been re-scanned. Photoshop again?](#)

Next article

[48. Why did black space turn green in NASA imagery?](#)

★

Cameraman L. Konovalov was with you. Until next time!